Rejections Under 35 U.S.C.§ 112

Claim 11 is objected to for the phrase, "the adhesive is a heat-stable."

In the response filed July 31, 2001, the Applicant erroneously amended Claim 2 rather than Claim 11. Accordingly, Claim 11 has been amended to recite "wherein the adhesive is a heat-stable adhesive". Claim 2 was amended to read as originally filed.

On p. 8, the Examiner stated that upon reentry of Claims 2, the 112 rejection over claim 2 set forth in the Office Action of 11-15-02 would be maintained. The Examiner alleges that since the test is subjective, the test as a whole is vague and indefinite.

On p. 3, lines 24-25, good roll stability is clearly defined as exhibiting a rating of less than "3" when prepared by hand and tested according to the Roll Stability test at 120°F for 10 days." The Roll Stability test is explicitly described on p. 19. The Applicant submits that although the magnitude of the visual defects are subjectively rated, one clearly can distinguish whether the defects have a "golf ball" appearance or whether the defects are smaller than golf balls, as golf balls have a standard size.

Rejections Under 35 U.S.C.§ 103

Claims 1-8, 11-14 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 99/14281 in view of JP 59-149970 and Kessel et al. (U.S. Patent No. 5,432,006).

On p. 4 of the Office Action at hand the Examiner stated that, "The Applicant's contend that since the liner of WO '281 fails to demonstrate any correlation between thermal expansion and roll stability, shrinkage is not equivalent to thermal expansion as alleged by the Examiner."

This statement, however, is not an accurate representation of the arguments set forth by the Applicant in the response filed July 31, 2001. Rather the Applicant argued that, "Since the Applicant has demonstrated that there is no correlation between thermal expansion and roll stability, shrinkage is not equivalent to thermal expansion as alleged by the Examiner." For if these properties were one in the same then the liner with the greatest thermal expansion would

also exhibit the greatest shrinkage. However, the data set forth by the Applicant refutes such correlation and thus teaches away form WO '281.

Note that according to p. 24 lines 1-2, "The data in Table II shows that Liner 2 exhibited significantly better roll stability that Liner 3, Liner 5 or Liner 6 at all test condition." Accordingly, one would expect according to the teachings of WO '281 that the thermal expansion of Liner 2 is similar to that of the substrate to which the liner is releasably adhered.

On p. 4, line 24 to p. 5, line 13, the thermal expansion and shrinkage test results of the liners is discussed as follows:

"Figure 1 depicts the thermal expansion of various liners in comparison to an adhesive coated substrate, "Sheeting 3870". The thermal expansion was measured using a Dynamic Mechanical Analysis (DMA) technique, as described in further detail in the forthcoming examples. Since the thermal expansion of the release liner is a function of the release liner backing, the thermal expansion of Liner 1 and Liner 2 is the same since these two liners have the same backing and only differ with regard to the release coating composition as well as the coefficient of friction of the release coating. ***Figure 1 illustrates that Liner 4 and Liner 6 exhibit thermal expansion most similar to that of the substrate (Sheeting 3870 with adhesive), whereas Liners 1 and 2, exhibit a thermal expansion less similar to the substrate.***

Figures 2 and 3 depict the shrinkage of Liners 1 and 2, Liner 5 and Liner 6 in comparison to an adhesive coated substrate, "Sheeting 3870". In Figure 2, the shrinkage was measured using another Dynamic Mechanical Analysis (DMA) technique, as described in further detail in the forthcoming examples. In Figure 3, the shrinkage was measured using a laser interferometer and a ball slide stage, as described in further detail in the forthcoming examples. Figure 2 depicts shrinkage at a constant temperature over a shorter duration of time, ranging up to 1200 minutes, whereas Figure 3 depicts the shrinkage at a constant temperature over a longer time span, up to 60 days. Both figures depict that Liner 1 and 2 exhibit shrinkage substantially greater than the adhesive coated substrate ("Sheeting 3870"), whereas Liner 5 and Liner 6 exhibit less shrinkage than the substrate."

The Examiner alleges that, "The evidence presented in Figure 1 and Table 2 fails to explicitly demonstrate that expansion and contraction is not equivalent to shrinkage - the

difference is film thickness, COF, and release coating are equally attributable to the difference in roll stability."

As noted on p. 18 of the present application, both Thermal Expansion and Shrinkage Test A employ dynamic mechanical analysis (DMA) techniques. Such technique measures gross physical properties of the polymer backing of the liner material. Accordingly, Thermal Expansion and Shrinkage Test A are not a function of film thickness. Further, since the amount of release coating is insignificant in comparison to the liner backing, it is commonly understood in the art that the release coating compositions would have an insignificant effect on the Thermal Expansion and Shrinkage Test A. This is also confirmed by the fact that Liner 1 and Liner 2 exhibited the same Thermal Expansion and Shrinkage plot in Figs. 1-3 even though Liner 2 had a different release coating than Liner 1.

Accordingly, the Applicant contends that although WO' 281 teaches "fashioning a release liner from a material that exhibits thermal expansion and contraction properties similar to those observed for the intended substrate", that thermal expansion is not equivalent to shrinkage. Further, the Applicant has demonstrated that applying the teachings of WO '281 alone does not result in good roll stability.

The Examiner further states that "Even if Applicants can explicitly demonstrate a difference between the expansion and contraction properties of WO'281 in relation to the presently claimed invention, JP '970 teaches that the shrinkage properties of a substrate and a liner in an adhesive film may be modified such that the release liner exhibits shrinkage properties 0-30% greater that that of the substrate."

A full translation of JP 59-149970 is being submitted concurrently with this response as the Examiner's rejection was based on the English abstract. JP '970 concerns a tacky paper used for electrostatic copying, magnetic copying, and for general office use. This reference concerns the expansion and shrinkage of paper due to humidity in the environment.

As described at p. 7, lines 1-10, in the present invention "shrinkage" refers to a sheet or film that exhibits a (1-L/LO) of greater than 0.05% at 10 days according to Shrinkage Test Method B." Claim 1 has been amended to include the definition of shrinkage to clarify this distinction. At p. 18, lines 25-32 it is clear that the shrinkage of the present invention is determined by a change in temperature, rather than differences in humidity.

With regard in particular to dependent claims 9-10 and 15-17 and news claim 41-43, one would not look to a reference concerning the printing of paper to improve the roll stability of a polymeric sheet or film such as retroreflective sheeting. Support for new claims 41-43 is found at p. 9, lines 3-23.

Accordingly to the MPEP 706.02(j), to establish a prima facie case of obviousness, three basic criteria must be met. First there must be some suggestion or motivation in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings. Second there must be reasonable expectation of success. <u>Finally, the prior art references must teach or suggest all the claim limitations</u>. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure.

The Applicant submits that the Examiner has failed to establish a prime facie case of obviousness with regard to claim 1 and dependent claims thereof since none of the references relied upon teach a liner (that) exhibits "shrinkage at 10 days according to Shrinkage Test Method B ranging from substantially the same as to greater than the substrate."

Claims 9-10, 15-18 and 21-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 99/14281 in view of Kessel et al. (U.S. Patent No. 5,432,006) and further in view of Rega et al. (U.S. Patent No. 6,054,208).

With regard to claim 9-10 and 15-18 the Applicant submits that none of the secondary references overcome the deficiency of the primary references in that the secondary references also fail to teach a liner (that) exhibits shrinkage ranging from substantially the same as to greater than the substrate.

Claim 21 recites, "An article comprising a substrate having an <u>encapsulated lens retroreflective viewing surface</u> and an opposing surface, an adhesive layer disposed between said opposing surface of the substrate and a liner, and the liner having an adhesive-facing surface releasably adhered to said adhesive; <u>wherein the adhesive-facing surface of the liner has a coefficient of friction of at least about 0.30</u>.

The Applicant previously argued that although Rega et al. teaches a genus of silicone release coatings, such teaching does not anticipate the species of such release coating having a coefficient of friction of at least 0.30. Although Kessel teaches a release coating having a

coefficient of friction of at least 0.30, there is no suggestion in Kessel or Rega, to employ such release coatings on liners with encapsulated lens retroreflective sheeting. There is no rationale as to why a portion of the release coatings of Kessel would be selected over any other silicone release coating suggested in the art. The Applicant would like to bring to the attention of the Examiner, the information presented in Table V, it has been standard in the industry to employ liners having a relatively low coefficient of friction for encapsulated lens retroreflective products The Applicant submits that the only motivation for employing a liner having a COF of at lease 0.30, hindsight based on the Applicant's present application for patent.

The Applicant has responded to all the rejections set forth by the Examiner. Reconsideration and a timely allowance is respectfully requested.

Respectfully submitted,

7-29-03
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Public Report of Opening of the Patent

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Tacky paper

Application of the patent: No. S 58-22212
Date of application: Feb. 15, 1983

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Publicized Report of Patent

Detailed Report

1. Name of invention
Tacky paper

2. Sphere of the patent application

(Claim 1)

Claim 1 is concerning a tacky paper where the ratio of the expansion ratio and/or shrinking ratio of the upper paper and release paper is (upper paper : release paper) 0.7 to 1.0 : 1.0.

(Claim 2)

Claim 2 is regarding the tacky paper in claim 1 where the expansion ratio and/or shrinking ratio of the release paper is 0.90 % or less.

3. Detailed explanation of invention

This invention is concerning a tacky paper which is used for electrostatic copying, magnetic copying, and for general office use.

Former tacky papers consists of an upper paper as shown in figure 1, a release paper with a pressure-sensitive tacky agent 2, and a release surface. Various types include:

(1) Ones which use quality paper for the upper paper and less expensive paper for the release paper.
(2) Ones which use quality paper for both the upper paper and the release paper.

However, with the former one, the release paper has higher expansion than the upper paper in high humidity, and it curls greatly toward the upper paper. In a low humidity environment, the release paper shows higher shrinkage than upper paper, and it curls greatly toward the release paper. When copying, the transport and transcribing characteristics are not stable, and transport or transcription failures occur continuously.

With the latter one, the shrinkage ratio of the upper paper and the release paper is either the same, or that of the upper paper is higher (upper paper shrinkage ratio / release paper shrinkage ratio = 1.0 or higher). The shrinkage ratio of the upper paper and release paper may both be around 1.2 %, which is high. When both sides are exposed to a high humidity or low humidity environment, this paper will not curl greatly, unlike the former tacky paper. However, when only one side is exposed – for example, in laminated condition, curl becomes large due to the expansion or shrinking of the exposed surface. When it is fixed by a thermal fixing roll, the upper paper with the picture image is heated by the roll, and shrinkage of the upper paper becomes high. Curl generated during fixing (will be called curl after copying in the following) becomes larger. These problems cause transport failures.

Accordingly, the object of this invention is to offer a tacky paper with excellent copying features for electrostatic copying, magnetic copying, etc.

The inventors of this invention made through research to solve these problems with the former tacky paper. As a result, it was found that the amount of curl can be controlled by balancing the paper shrink and expansion ratio of the upper paper and release paper. This finding led to this invention.

That is, this invention offers a tacky paper which is good for copying, especially transport. In this invention, the paper expansion and shrink ratio of the upper paper and release paper are the same, or the expansion and shrink ratio of the upper paper is smaller. The paper expansion and shrink ratio of the upper paper and release paper are also reduced.

In more detail, this invention is concerning a tacky paper where the ratio of the expansion ratio and/or shrinking ratio of the upper paper and release paper is (upper paper : release paper) 0.7 to 1.0 : 1.0. The expansion ratio and/or shrinking ratio of the release paper is 0.90 % or less.

The paper expansion and shrink ratio in this invention is measured by cycling the paper through the following conditions in unloaded condition: 65 % ∏90 % ∏ 65 %∏ 20 % ∏ 65 %> the ratios are calculated from the following formula. In this case, the sample is pre-adjusted to stabilize its moisture content for 24 hours at 20 C, 65 % R.H. , and then it is measured during the above cycle using an H · K type expansion and shrink ratio test machine (refer to Japan patent No. S 55-89747).

Expansion ratio = E1 + E2 (%)

Shrink ratio = S1 + S2 (%)

E1 = expansion ratio from 65 % R.H. to 90 % R.H.(%)

E2 = expansion ratio from 20 % R.H. to 65 % R.H.(%)

S1= shrink ratio from 90 % R.H. to 65 % R.H.(%)

S2= shrink ratio from 65 % R.H. to 20 % R.H.(%)

In the tacky paper of this invention, curl after copying is reduced by adjusting the expansion and shrink balance of the release paper up to 30 % of that of the upper paper maximum. At the same time, by setting the shrink ratio to 0.90 % or less, preferably 0.80 % or less in the cross web direction, the increase in curl due to changes in the of environment is controlled.

The upper paper and release paper used in the tacky paper of this invention can be selected freely as long as they satisfies the condition of 0.90 % or less expansion and shrink ratio while considering the expansion and shrink balance between the upper paper and release paper.

When upper paper and release paper are the same and a mold release treatment is administered to the release paper, the expansion and shrink ratio can be higher than the expansion and shrink ratio of the release paper only.

In addition, paper with 0.90 % or less expansion and shrink ratio can be prepared by selecting a paper currently on the market with a small expansion and shrink ratio such as: one-sided glossy paper (Japan patent No. S 55-129475), water-proof synthetic resin in paper (Japan patent No. S 55-129474). The appropriate ratio can also be attained by adjusting the pulp combination, adjusting the combination of materials used, adjusting density, changing the fiber orientation by changing the process conditions, etc. These

papers can be used for labels as-is for the upper paper. Furthermore, a mold-release treatment can be applied to the substrate to make a release paper.

Next, the tacky paper of this invention is going to be explained using examples of practice and examples of comparison.

Example of practice 1

Talc (10 weight %), sizing, and a sulfuric acid band was added to pine tree craft pulp (NBKP), latifoliate craft pulp (LBKP), and Freeness 250 ml (NBKP / LBKP = 20/80) to make an original paper label stock with a 45 g/m^2 weight. This paper was coated with 0.4 g/m^2 polyvinyl alcohol (PVA) containing a small amount of electro conductive agent, and label paper was acquired.

An original release paper was manufactured by a similar method. Next, 0.8 g/m^2 of PVA was applied. In addition, 0.8 g/m2 of addition reaction type silicon was applied by a gravure coater. After heating and drying at 150 C , a release paper was acquired.

Using the label paper and release paper above, an acryl based tacky agent was applied, and tacky paper was acquired.

The expansion and shrink ratio of this upper paper and release paper, curl in low-humidity and high-humidity environment, and electrostatic copying test results are shown in table 1 below.

Example of practice 2

NBKP and LBKP were decomposed in 370 ml of Freeness (NBKP / LBKP = 10/90), 2.2 weight % of urea resin was added , and a 50 g/m^2 upper label paper was made.

NBKP and LBKP were decomposed in 320 ml of Freeness (NBKP / LBKP = 10/90), and 52.3 g/m^2 paper was made. Next, it was coated with 0.9 weight % of epoxy base polyamide resin , and an original release paper was acquired. Then 0.5 g/m^2 of PVA and 0.8 g/m^2 of condensation reaction type silicon was applied, and a release paper was acquired.

Using the label paper and release paper above, an acryl based pressure sensitive tacky agent was applied, and a tacky paper was acquired. This tacky paper was tested the same as in example of practice 1. Results are shown in table 1 also.

Example of practice 3

0.5 g/m^2 of PVA was coated on the glossy side of a one-sided glossy craft (52.3 g/m^2) made by Chuetsu Pulp. In addition, 0.7 g/m^2 of addition reaction type silicon was applied, and release paper was acquired.

The upper label paper from example of practice 2 and the release paper above were used with an acryl based pressure sensitive tacky agent to make a tacky paper. This tacky paper was tested the same as in example of practice 1. Results are shown in table 1 also.

Example of comparison 1

Corona S (47 g/m^2) made of India paper Honshu Seishi was used as the upper paper. The release paper was made by applying 0.5 g/m^2 of PVA to grashin paper (64 g/m^2) made by Honshu Seishi, and 0.8 g g/m^2 of condensation reaction type silicon was applied.

The label paper and release paper above were used with an acryl based pressure sensitive tacky agent to make a tacky paper. This tacky paper was tested the same as in example of practice 1. Results are shown in table 1 also.

Example of comparison 2

Foam paper made by Oji Seishi (52.3 g/m^2) was used as the upper paper. The release paper was made by applying 1.0 g/m^2 PVA and 0.8 g/m^2 of addition reaction type silicon to foam paper (52.3 g/m^2) made by Shikoku Seishi.

The label paper and release paper above were used with an acryl based pressure sensitive tacky agent to make a tacky paper. This tacky paper was tested the same as in example of practice 1. Results are shown in table 1 also.

From table 1, it is obvious that the tacky paper in this invention (examples of practice 1 to 3) is superior to former ones (examples of comparison 1, 2) with respect to curl and transport properties for electrostatic copying machines.

4. Simple explanation of figures

The figure is a cross section of tacky paper.
In the figure;
1: upper paper
2: pressure sensitive tacky agent layer
3: release paper
4: mold release agent

Assigned representative: Kiyotaka Sasaki, Patent Attorney (and 3 others)

Table 1

Example of practice	Expansion ratio			Shrink ratio			Curl (note 1)			Transp (note 1
	Upper paper A %	Release paper B %	Expansion ratio A/B	Upper paper C %	Release paper D %	Shrink ratio C/D	Uniform humidity (note 2)	Humidity one side only (note 3)	Heat fixing roll	
1	0.77	0.85	0.91	0.82	0.87	0.94	O	O	O	O
2	0.66	0.90	0.73	0.63	0.89	0.71	O	O	O	O
3	0.66	0.77	0.86	0.63	0.73	0.86	O	O	O	O
Example of comparison 1	1.07	1.87	0.57	1.11	1.87	0.59	X	X	X	X
Example of comparison 2	1.22	1.16	1.05	1.24	1.06	1.17	Δ	X	X	Δ

Note 1) O: good, Δ: slightly inferior, X: bad

Note 2) curl when humidity is adjusted uniformly for 2 hours in high humidity (85 % R.H.), low humidity (30 % R.H.) (both at 20 C).
Note 3) curl in 50 laminated samples after 2 hours in the same environment as note 2.